Project 25 Update

Presented by:

The
Project 25 Technology Interest Group

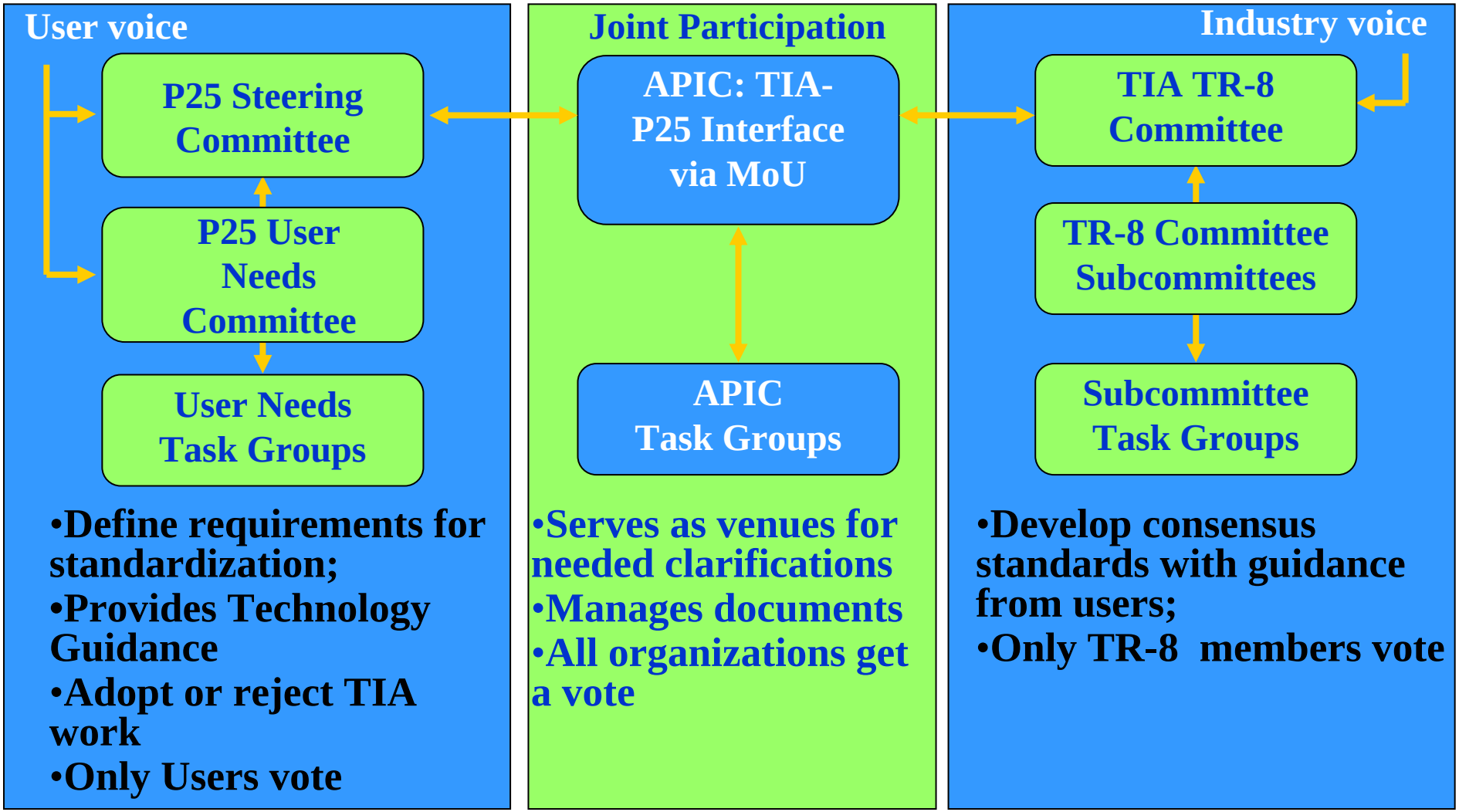
http://www.project25.org

Presentation Agenda

- Project 25 Overview
- Project 25 Work In Process
  - User Requirements
  - P25 Interoperability
  - Wireline Interface Standards
  - TDMA
    - P25 FDMA and TDMA Interoperability
  - Data

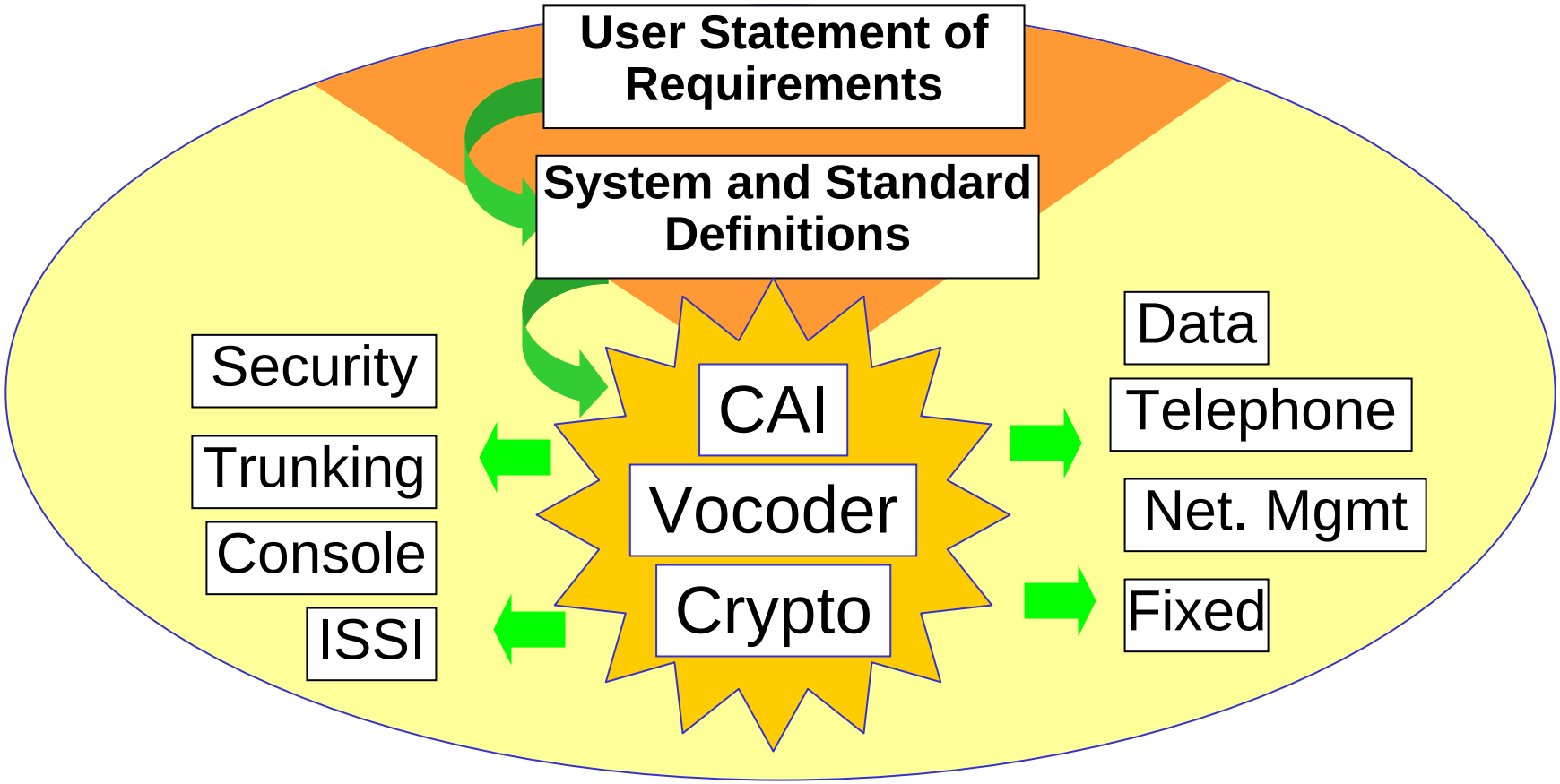
Project 25 Overview

P25/TIA Standards Process Map



APIC: APCO Project 25 Interface Committee
TIA: Telecommunications Industry Association

Project 25 Process Drives Documentation



CAI: Common Air Interface

Project 25 System Model

RF SubSystem

The RFSS provides for processing all of the calls, setting up of all the command and control messages, and routing of all voice and data packets. The RFSS forms the heart of the traditional radio network

Project 25 Interfaces

- Common air interface (U_m) –defines the wireless access between mobile and portable radios and between the subscriber (portable and mobile) radios and the fixed or base station radios
- Fixed station interface (E_f) –describes the signaling and messages between the RFSS and the fixed station by defining the voice and data packets and all of the command and control messages used to administer the fixed station as well as the subscribers that are communicating through the fixed station. (Currently conventional only, Not applicable in all configurations,)
- Console interface (E_c) –is similar to the fixed station interface but it defines all the signaling and messages between the RFSS and the console, the position that a dispatcher or a supervisor would occupy to provide commands and support to the personnel in the field
- Inter RF subsystem interface (G) –permits users in one system to communicate with users in a different system, from one jurisdiction to another, from one agency to another, from one city to another, etc.

Project 25 Interfaces (cont.)

- Subscriber data peripheral interface (A) –characterizes the signaling for data transfer that must take place between the subscriber radios and the data devices that may be connected to the subscriber radio
- Network management interface (E_n) – to the RFSS that allows administrators to control and monitor network fault management and network performance management.
- Data network interface (E_d) – describes the RF subsystem's connections to computers, data networks, external data sources, etc.
- Telephone interconnect interface (E_t) – between the RFSS and the Public Switched Telephone Network (PSTN) allows field personnel to make connections through the public switched telephone network by using their radios rather than using cellular telephones

Project 25 “Phases”

- “Phase 1” defines FDMA work adopted August 1995, meeting FCC goal of 12.5 kHz operation
- “Phase 2” defined to address everything else in the SoR not completed in 1995, such as …
  - Satisfy the FCC requirement for 6.25e equipment
  - Enhancement, not a replacement of Phase 1
  - Intersystem interface
  - Fixed Station and Console Interfaces
  - New, modified, or enhanced features and services
  - Wideband data (Project 34)

Project 25 Activity…
Work In Progress

P25 Work In Progress

- User Requirements
  - P25 Statement Of Requirements (SOR) reformatting and updates
- P25 Interoperability
  - Document Updates
  - Planning for P25 Compliance Assessment Program
- Wireline Interface Standards
  - Inter Sub System Interface
  - Fixed Subsystem Station Interface
  - Console Subsystem Station Interface
- TDMA
  - P25 FDMA and TDMA Interoperability
- Data

User Requirements – P25 Statement Of Requirements (SOR)

- Reformatting
  - Identify each requirement as:
    - Information only
    - Applying to FDMA Phase 1 only
    - Applying to TDMA Phase 2 only
    - Applying to both FDMA and TDMA
- Updating
  - Clarifying existing features
  - Adding new features

Document Updates

- Trunking Procedures
  - Current Efforts:
    - Refresh FDMA baseline document
  - Pending Efforts:
    - Inter RF Sub-System Interface addendum
    - TDMA addendum
    - New Features

- Authentication Updates
  - Trunking Messages
  - Trunking Procedures
  - Link Control Words

3 Steps to P25 Compliance

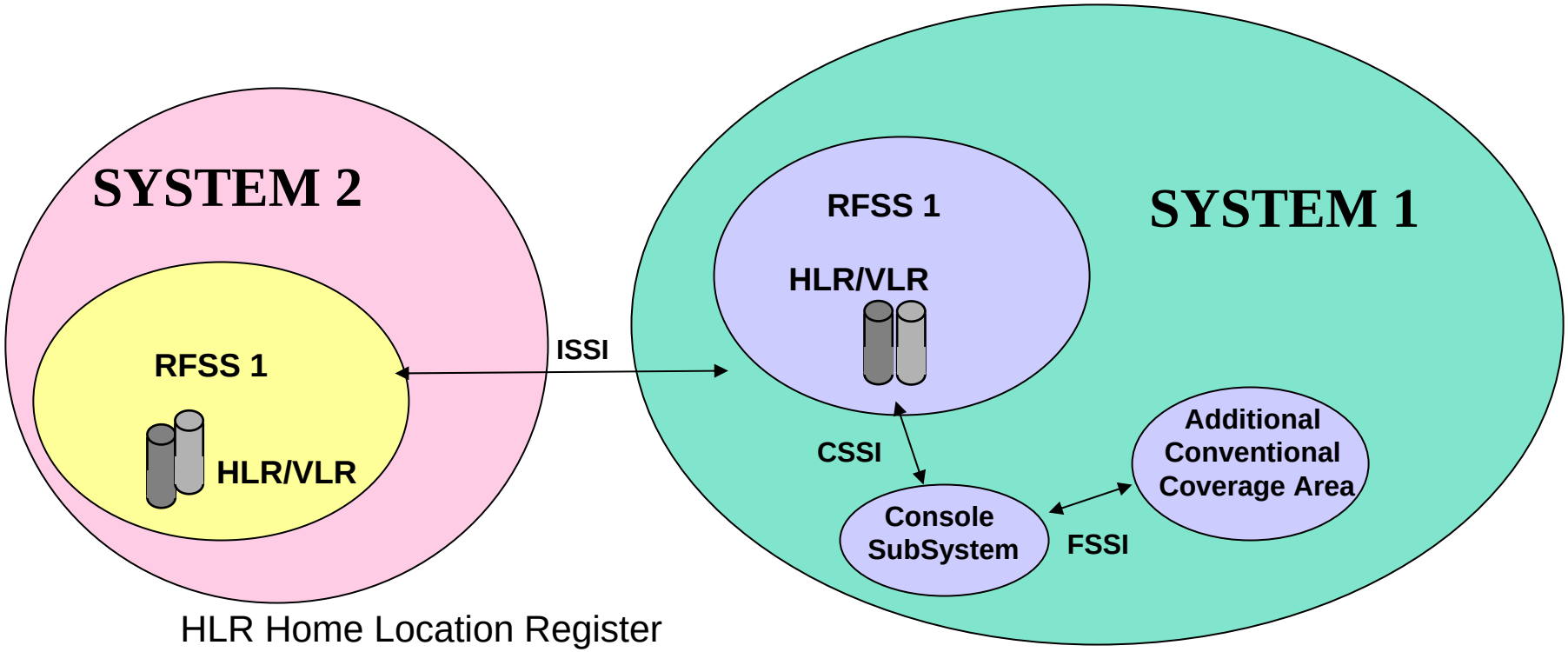
- **Performance**
  - Implementation/endpoint/interface is ‘legitimate’ – it meets minimum requirements as specified in the standard
  - Covered in TIA committees, TR-8.1 and TR-8.6
  - Need this before proceeding to conformance testing
  - “can do this alone – test equipment only”
- **Conformance**
  - Implementation/endpoint/interface responds to the receipt of a message (stimulus) as specified in the documented standard.
  - Checking for proper order and content of messages as specified in the standard
    - Fixed Station Interface example: Air Interface stimulates Fixed Station, FSI puts an appropriate message on the wireline side
  - “can do this alone – test equipment only”
- **Interoperability**
  - The equipment from one manufacturer interacting with equipment from another manufacturer can successfully provide a mandatory or standard option service. (Functional Test)
  - This definition is consistent with the Interoperability Testing documents authored by ITS.
  - “cannot do this alone – need another manufacturer”

NIST/OLES/P25 Conformity Assessment Program

- NIST/OLES (National Institute of Standards & Technology/Office of Law Enforcement Standards) and ITS (Institute for Telecommunication Sciences) were tasked by the P25 Steering Committee to implement a P25 compliance assessment program
- In November 2005, representatives of TIA and representatives of NIST/OLES met to discuss the next steps regarding this P25 compliance assessment program.
  - They agreed to form a joint government/industry group of key stakeholders and experts that will research ideas and proposals and create a consensus proposal for the establishment of a Project 25 Conformity Assessment Program.
- The joint government/industry group, now known as the P25 Conformity Assessment Working Group, has begun conference calls to move the proposal work forward
- TR8 working groups have agreed to a conformance test template and are reviewing/drafting/planning respective conformance test documents

Wireline Interfaces

ISSI, Fixed Station Subsystem Interface and Console SubSystem Interfaces



HLR Home Location Register
VLR Visitor Location Register
RFSS Radio Frequency Sub System
ISSI Inter Sub System Interface
FSSI Fixed Station Subsystem Interface
CSSI Console Sub System Interface

Wireline Interface Standards

- Up to 6 documents per interface
  - Overview, Messages & Procedures, Methods of Measurement, Performance Guidelines, Conformance, Interoperability
- Inter Sub System Interface (ISSI)
  - Scope 1
    - Trunked Talkgroup call, Unit to Unit call (Individual), Mobility (Subscriber roaming) and Authentication
    - **ISSI Overview published 12/03**
    - **ISSI Scope 1 Messages and Procedures document approved for publication 5/06**
    - Methods of Measurement, Performance Guidelines and Conformance publication is targeted for 1/07
  - Scope 2
    - Data, OTAR (Over The Air Rekeying), Conventional, Console across ISSI, Supplementary data (call alert, etc.)
    - Scope 2 Messages and Procedures publication is targeted for 1/07

Wireline Interface Standards (cont)

- Fixed Station Subsystem Interface Conventional
  - Scope 1: Voice & Station control for analog/P25 air interface supported over 4-wire (analog) and Ethernet (digital) transport between console and single fixed station.
  - **FSSI Scope 1 Messages published 6/06**
  - FSSI Scope 1 Conformance publication targeted for 1/07
- Console Sub System Interface Conventional
  - Re-use the FSSI work as much as possible
- Fixed Station Subsystem Interface and Console Sub System Interface Trunked
  - Re-use the ISSI work as much as possible

TDMA

Drivers for TDMA Air Interface

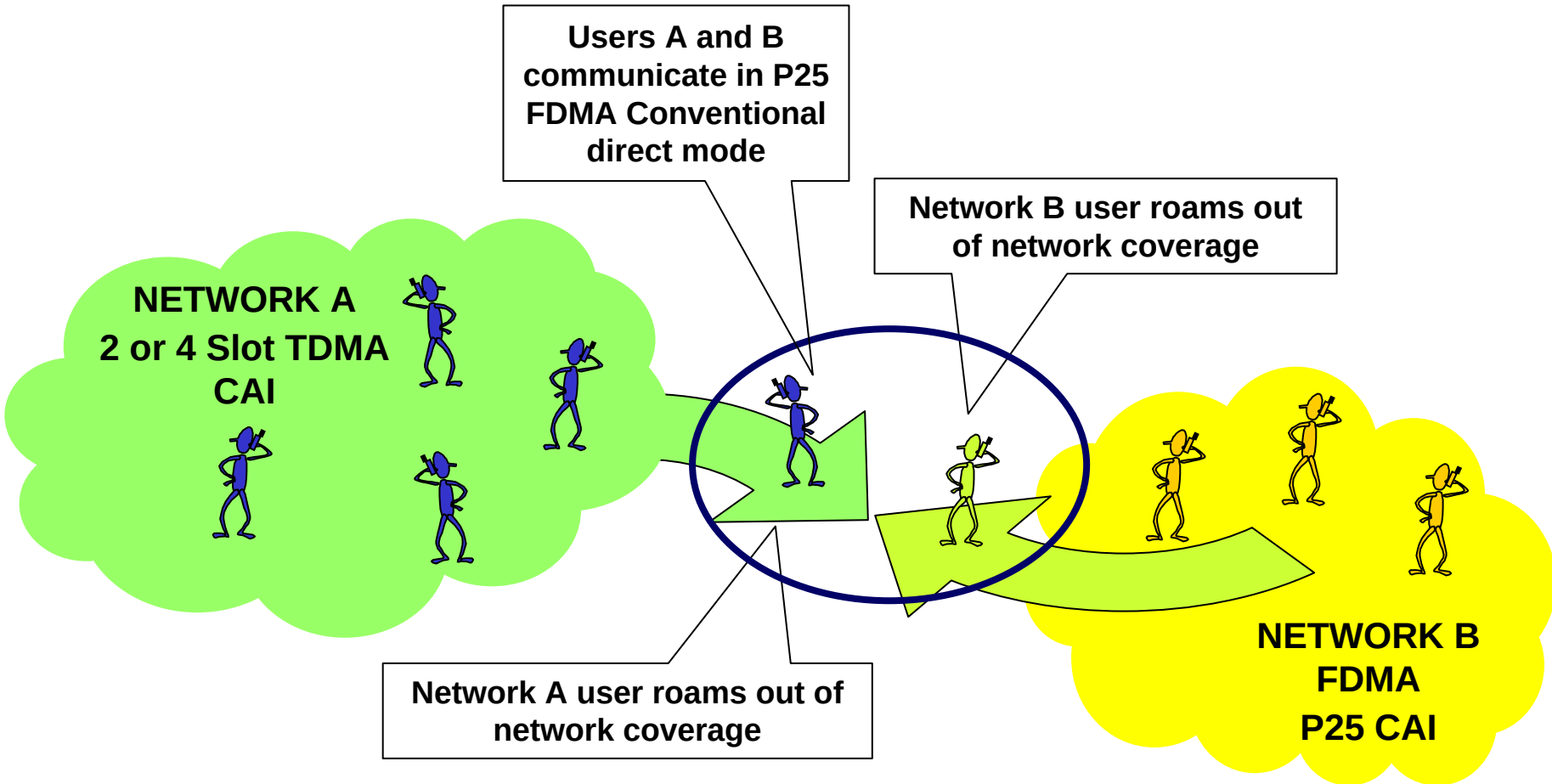
- FCC - Spectral Efficiency
  - 6.25 kHz efficiency ruling
    - 2 slot in 12.5kHz for 6.25 kHz efficiency
    - 4 slot in 25kHz for 6.25 kHz efficiency
  - Additional capacity needed, particularly in urban areas
- Smooth migration from FDMA to TDMA
- Backwards compatibility with FDMA and Analog
- TDMA coverage same as FDMA
- Improved audio quality

P25 TDMA – Attributes

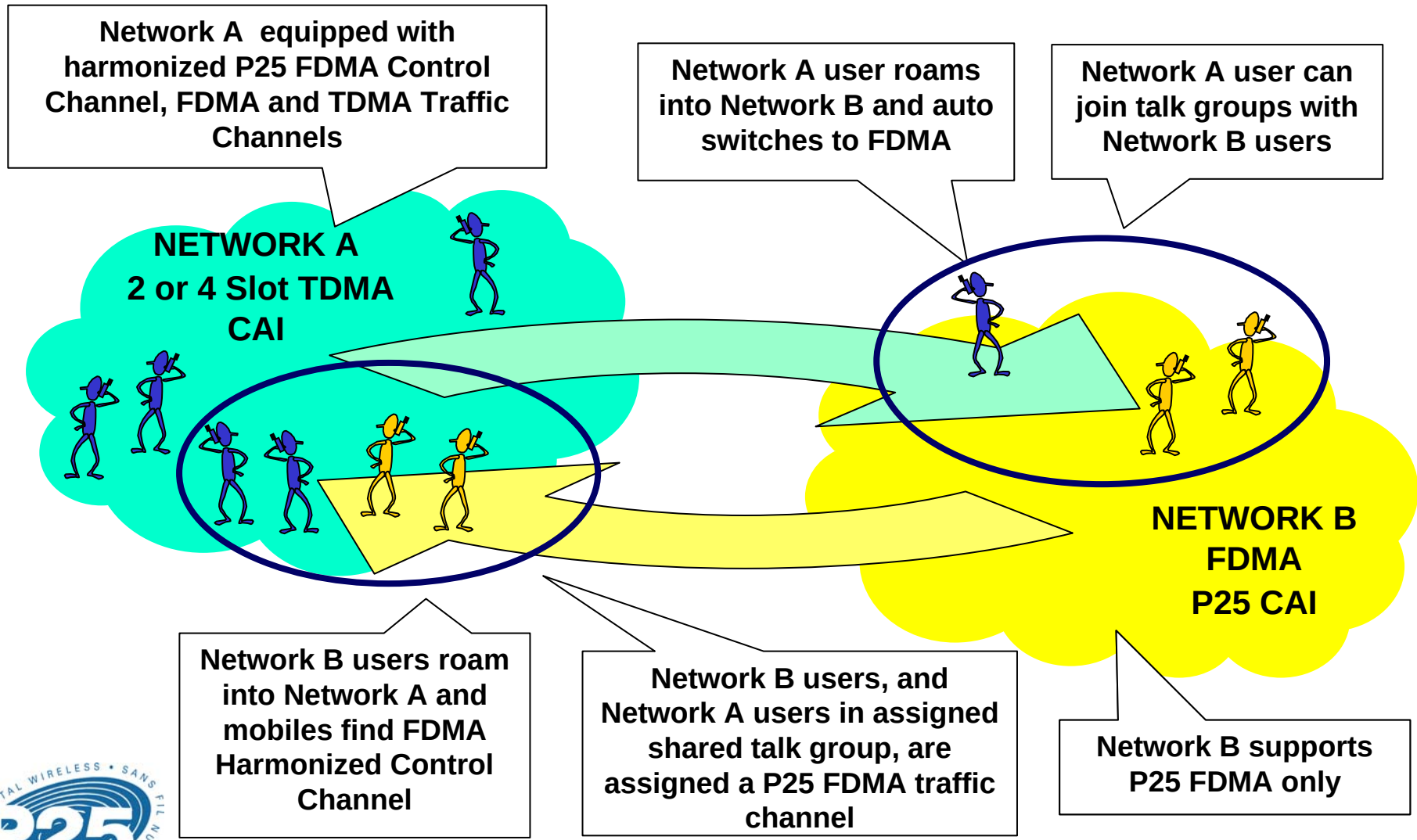
- Enhanced FDMA Control Channel
  - Updates to FDMA CCH to accommodate TDMA traffic channel control and assignment
  - Controls FDMA and TDMA subscriber units
  - Interoperability with FDMA for joint operations and migration
- Support for FDMA subscriber units in TDMA systems
  - Interoperability & migration
  - Preservation of FDMA subscriber investments
- FDMA Conventional Direct mode
  - Operating mode for TDMA subscribers when outside of coverage area
- Two channels in 12.5 kHz or four channels in 25 kHz
  - Achieves FCC 6.25 kHz channel efficiency
  - Compatible and interoperable vocoders
  - Encryption interoperability (DES or AES)
- Vocoders
  - Dual rate for FDMA interoperability
  - Accommodate enhanced vocoders for improved voice quality

P25 FDMA and TDMA Interoperability

Agency Interoperability – P25 FDMA Direct Mode Common Air Interface (CAI)



Migration Support – FDMA Harmonized Control Channel for trunked FDMA support



DATA

Data Service Standards

- Narrowband Data (12.5/25kHz Channels)
  - Work has started on the Data Interoperability Testing Document
  - Integrated Voice and Data (IV&D) supported
  - Allows for Data and Voice channel sharing

- Wide Band Data (50/100/150kHz Channels)
  - 13 Wideband Data (SAM) documents published
  - Media Access Control (MAC) / Radio Link Access (RLA) Layer Specification TIA-902.BAAC work in progress to up issue from TIA standard to ANSI standard and update document

TR-8.8 Broadband Data Communications

- Address new 4.9 GHz spectrum in US
- Broadband Data Standards Definition TSB-1065 approved for publication
- Analyze SAFECOM use cases and scenarios
- Develop performance simulation methodologies
- Leverage existing bodies of work where possible
- Add appropriate mission-critical enhancements where necessary
- Recognizes that User requirements exist for both mission-critical and best-effort solutions
- Expected interoperable services include data, imaging, video, multimedia
- Secondary requirements include voice

Thank You!

PTIG Commercial Members:

Aeroflex, Inc.
Catalyst Communications Technologies
CTA Communications, Inc
Daniels Electronics Ltd.
Datron World Communications Inc.
DVSI
EADS Public Safety Inc.
EFJohnson Company
Federal Engineering
General Dynamics
Honeywell Batteries
Icom America
Kenwood
M/A-COM
Midland Radio
Motorola
Pantel International Inc.
RELM Wireless Corporation
Tait Electronics
Technisonic Industries Ltd.
Thales Communications Inc.
TMC Radio
Vertex Standard, Inc.
Westel RF Technology Corporation
Wireless Pacific
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